FIRST RECORD OF *CORNIGER SPINOSUS* AGASSIZ, 1829 (PISCES : BERYCIFORMES : HOLOCENTRIDAE) FROM THE EASTERN ATLANTIC (CANARY ISLANDS)

by

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ABSTRACT. - The first record of *Corniger spinosus* Agassiz, 1829, from the Canary Islands and from the Eastern Atlantic, is presented. The morphometric and meristic characters of the specimens studied are given and discussed in relation to data presented by other authors. The bathymetric and geographic distribution of the species and the importance of the amphiatlantic distribution pattern of the shorefish populations in the Canary Islands are discussed.

RÉSUMÉ. - *Corniger spinosus* Agassiz, 1829, est signalé pour la première fois des îles Canaries et de l'Atlantique oriental. Les caractéristiques morphométriques et méristiques des exemplaires étudiés sont comparées avec celles de la littérature. La distribution bathymétrique et géographique de l'espèce et l'importance du modèle de distribution amphiatlantique du peuplement ichtyologique côtier des îles Canaries sont discutées.

Key-words : Holocentridae, *Corniger spinosus*, ASE, Canary I., First record.

The history of the discovery of this species in the Canary Islands (only from La Palma) began at the beginning of 1982, when one of us (A. Brito) was taking photographs of a dissected specimen in a fish collection from Santa Cruz de La Palma. From the study of these photographs, Dooley *et al.* (1985) included this species under the denomination of *Holocentrus sp.* in their check-list of shorefishes of the Canary Islands but they were doubtful whether it truly belonged to the coast of La Palma. These authors erroneously listed this specimen in Las Palmas Museum (Gran Canaria) but the specimen was really placed in La Palma.

At the beginning of 1985, the first author went to La Palma to examine the dissected specimen and was fortunate because a second specimen had been recently caught and was still frozen. This gave the opportunity to correct the identification of the two specimens as in fact *Corniger spinosus* Agassiz, 1829, and provided precise locality data and other information concernning their capture.

Recently, in 1987, thanks to the collaboration of Mr Ramón Gómez and Mr Gustavo Pérez-Dionis, we were able to study two freshly caught specimens and take photographs of their conserved coloration (Fig. 1). These collaborators reported that they had observed about five specimens of this species in La Palma : the four that we had studied and one other returned to the sea by the fishermen.

Corniger spinosus is exclusively distributed in the tropical sector of the Western Atlantic Ocean, and was studied, after its original description, by Cuvier and Valenciennes (1831). They described *Holocentrum cornigerum*, later referred to as *Corniger spinosus*. The most important work on this species was realized by Woods and Sonoda (1973), who gave morphological and biometrical characteristics, and information on the biology, ecology and list of citations. Later, Woods and Greenfield (1977), Guitart (1979) and Randall, Shimizu and Yamakawa (1982) gave further data on this species, especially its known distribution.

Corniger spinosus was not included by Lozano and Lozano (1985) in their preliminary list of the Berycomorphi of the Canary Islands. It increases to ten the number of species of this order (excluding Stephanoberycoidei) present in the Canaries and is the only species belonging to the Holocentridae in the Islands.

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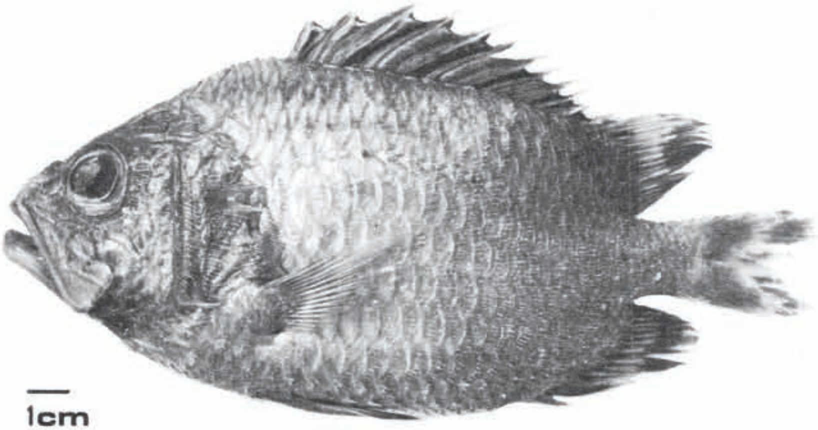

Fig. 1 : *Corniger spinosus* Agassiz, 1829. General view.

MATERIAL

Fuencaliente (La Palma ; Fig. 2) August 1981 ; 1 specimen of 135 mm total length, captured by traps at unknown depth. Dissected when we studied it. Preserved in the collection of the Arocha brothers (Santa Cruz de La Palma).

Tazacorte (La Palma ; Fig. 2) April 1985 ; 1 specimen of 170 mm total length, captured by traps at unknown depth. This specimen was sudied fresh, and dissected and preserved in the collection of the Arocha brothers (Santa Cruz de La Palma).

Garafía (La Palma ; Fig. 2) February 1987 ; 1 specimen of 223 mm total length, captured by gill net at 100 meters depth. Preserved in the fish collection of the Department of Animal Biology at the University of La Laguna and referenced as CCML 01/247.

Garafía (La Palma ; Fig. 2) December 1987 ; 1 specimen of 183 mm total length captured by gill net at 100 meters deep. Preserved in the fish collection at the Museum of Natural Sciences of Santa Cruz de Tenerife (TFMC), referenced as VP/0090.

RESULTS

Morphometric and meristic characteristics

Proportional dimensions as percentage of standard length are used for morphometric characters and variations of meristic characters are shown (values with * corresponding only to CCML 01/247 and TFMC VP/0090 specimens).

Morphometric characters : Cephalic length (Lc) : 34.3 - 37.93 % ; preorbitary length (Lpo) : 7.55 - 9.56 % ; orbitary length (Lo) : 9.3 - 11.72 % ; interorbitary length (Lio) : 5.81 - 9.65 % ; dorsal fin base length (Ld) : 53.79 - 56.52 % ; anal fin base length (La) : 19.23 - 22.75 % ; maximum depth (H) : 47.09 - 48.96 % ; minimum depth (h) : 9.56 - 10.34 % ; (*) pectoral fin base length (Le) : 23.07 - 25 % ; (*) prepectoral length (Lpe) : 37.2 - 39.74 % ; (*) spiny dorsal fin base length (Led) : 44.76 % ; (*) spiny anal fin base length (Lea) : 8.74 % ; (*) predorsal length (Lpd) 37.17 - 37.79 % ; (*) preanal length (Lpa) : 67.30 - 72.67 % ; (*) vertical orbitary length (Lov) : 9.88 - 10.25 %.

Meristic characters (numbers of specimens given in parenthesis) : Dorsal fin (D) : XI + I + 13 - 15 (XI +I +13 (1), 14 (1), 15 (2)) ; anal fin (A) : IV + 10 - 11 (IV + 10 (2) - 11 (2)) ; pectoral fin (P) : I +15 ; pelvic fin (V) : I + 7 ; scales above the lateral line (Es-1) (Fig. 3a) 3 ;

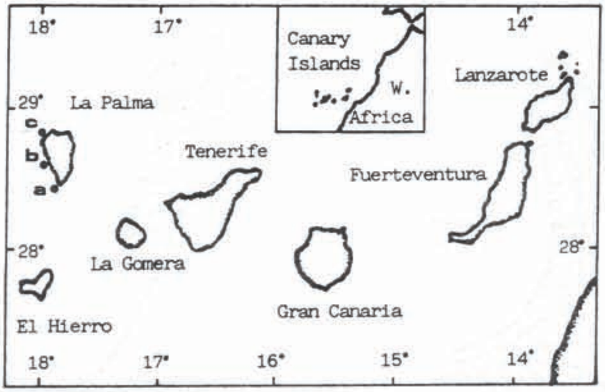

Fig. 2 : Capture localities for the four specimens of *Corniger spinosus* in the Canaries. (a : Fuencaliente ; b : Tazacorte ; c : Garafía).

scales below the lateral line (Es-2) : 7-8 (7(1)-8(3)) ; lateral line scales (LL) (Fig. 3b) 29 - 30 (29 (1)- 30(3)) ; (*) branchiostegal rays (RB) : 8 ; (*) gill rakers (Br) : 5 - 7 + 1 + 11 - 12 (1 specimen with 5 + 1 + 11 and 1 specimen with 7 + 1 + 12) ; (*) pyloric caeca : 13-14 ; (*) caudal fin (C) : IV + ii + 9 + 8 + ii + III.

Colour

We give the characteristics of the coloration of our specimens because in the literature some aspects are not presented. The colour when fresh is bright red on head, back and all fins ; on pectoral and pelvic fins is less intense. Ventral region red to rosy. Cephalic spines transparent to rosy. Inside mouth rosy to whitish. Peritoneum rosy.

DISTRIBUTION AND BIOLOGY

Prior to this study, *Corniger spinosus* was only known from the tropical sector of the Western Atlantic Ocean : coast lines of Rio de Janeiro (Brazil), northern Cuba, eastern Florida and southern South Carolina. In these places, the species is not frequent ; Woods and Sonoda (1973) reported it is known as a rarity by the local fishermen, and we can confirm this opinion was also expressed by the fishermen from the Canaries. The presence in La Palma waters considerably enlarges the range of *Corniger spinosus,* but the populations seem localized.

On the habitat aspect, Woods and Sonoda (1973) and Guitart (1979) reported the species lives in rocky areas, betweeen 50 and 180 meters depth. The specimens captured in the Canaries were also found at this depth range.

The biology of *Corniger spinosus* is poorly known, due without doubt to the relatively poor captures of this species. The comments on its biology in works by Woods and Sonoda

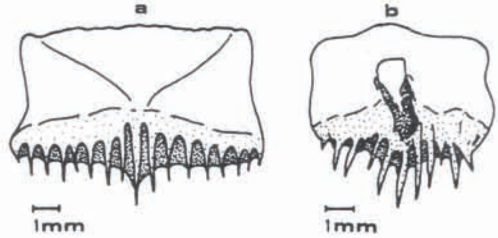

Fig. 3 : Scales of *Corniger spinosus* (a : dorsal scale above the lateral line ; b : scale of the anterior portion of the lateral line).

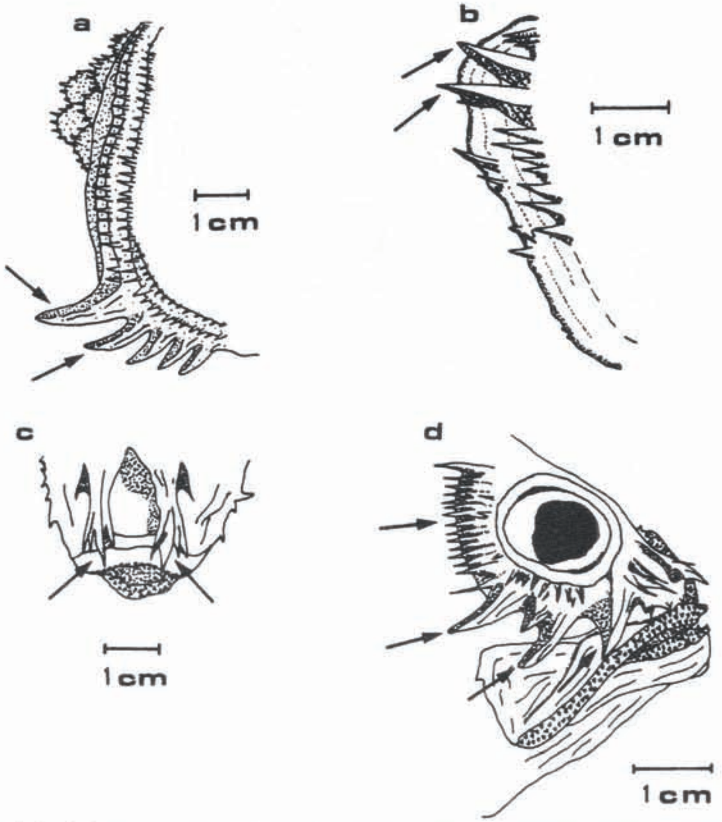

Fig. 4 : Morphological structures and differential characteristics of *Corniger spinosus* (a : preopercle and preopercular spines ; b : opercle and opercular spines ; c : nasal spines ; d : suborbitary spines and postorbitary bone) .

(1973), Randall (1968), Böhlke and Chaplin (1968) and others that study the ichthyology of the Tropical Western Atlantic (the known distribution area of this species) are limited or non existant.

Nothing about the food habits can be given because in the two specimens we studied the stomachs (CCML 01/247 and TFMC VP/0090) were empty.

The reproduction is also unknown but probably does not differ from that in other holocentrid fishes, in which they are live cycles including planctonic larvae and postlarvae very different from the adults. The CCML 01/247 specimen exhibited sexual glands in repose condition, restricted to the postsuperior part of the abdominal cavity, and the TFMC VP/0090 specimen was in the post-spawning condition.

DISCUSSION

The specimens of *Corniger spinosus* studied by us do not present any morphological differences from the western atlantic specimens studied by other authors. The cephalic spines (Fig. 4) are very similar in both eastern and western specimens. We can only distinguish a small difference in the number of anal rays : Woods and Sonoda (1973) give IV + 9 - 12 anal fin formula, but report that the specimens with 9, 10 and 12 anal soft rays are rare ; Guitard (1979) gives IV + 12 anal fin formula for the cuban specimens, and Agassiz (1829 *fide* Cuvier and Valenciennes, 1831) gives III + 12, but he did not count the first anal spine. Two of our four specimens have 10 anal soft rays and other two have 11 anal soft rays (Table I). The morphometric characteristics are nearly the same as those of the western specimens (Table II). We note that the data, as percentage of standard length, for the orbitary length and depth of the first specimen we studied (dissected before we could examine it) do not exibit the variation range of both parameters seen in the other specimens because the eye size and depth were not longer reliable values.

The size of the specimens of *Corniger spinosus* is moderate, never reaching 250 mm : Woods and Sonoda (1973) studied specimens between 103 and 149 mm standard length and gave the data on the size of specimens studied by other authors. They pointed out that the largest specimen from Brazil was 167 mm total length, but the records found in the literature gave 197 mm total length. We have studied one specimen of 223 mm total length and , at the present time, it is a new record for this species.

In order to explain the presence of *Corniger spinosus* in the Canaries, being a bentonic species, we must take in to account the possibility of the species having come by means of larvae dispersed or carried from the Western Atlantic by the North Atlantic currents ; the descendent hand, the Canary current, directly passes our islands. The exclusive presence of this species in La Palma is considered to be a recent colonization. The surface temperature is a little bit greater

Table I : Comparative data of *Corniger spinosus* between east and west coasts of Atlantic Ocean (LL : lateral line scales).

Geographic area	Fins			Gill rakers	References
	Dorsal	Anal	Pelvic		
Brasil	XII+15	III+12	6	-------	Agassiz, 1829
West Atl.	XI+I+13-14	IV+9-12	I+7	6-8+1+11-13	Woods & Sonoda, 1973
Cuba	XII+15	IV+12	---	-------	Guitart, 1979
Canaries	XI+I+13-15	IV+10-11	I+7	5-7+1+11-12	

Table II : Comparative data of *Corniger spinosus* between east and west coasts of Atlantic Ocean. Data of west atlantic specimens are given by Woods and Sonoda (1973). The values of Lc, Lpo, Lo, Lio, Ld, La, H and h are related to the standard length.

	Lt	Lst	Lc	Lpo	Lo	Lio
West Atl.	-------	103-149	38.5-41.3	7.9-9.5	11.9-14.3	5.4-6.5
Canaries	135-223	115-172	34.3-37.9	7.6-9.6	8.7-11.7	5.8-9.7

	Ld	La	H	h
West Atl.	---------	---------	42.4-49.7	10.1-11.1
Canaries	53.8-56.5	19.2-22.8	40.9-49.0	9.6-10.3

in the west islands (El Hierro and La Palma) but there are no real thermic differences at the depth at wich this species lives.

The localization of the Canary Islands in a subtropical latitude, in the path of the currents of the North Atlantic Ocean, has been a considerably important factor in the faunistic colonization of the islands. We suspect it has permitted the arrival and establishment from the American coast of a great number of tropical and subtropical species. If we consider the check-list of the shorefishes of the Canary Islands of Dooley *et al.* (1985) - in which the Chondroichthyes are excluded - and exclude some incorrectly placed species and the doubtful species, we find that about 45 species (23.6 %) from a total of 190, have an amphiatlantic distribution pattern in tropical and subtropical sectors. Among these species, about 10 (6.8 %) have a characteristic distribution pattern, because in the Eastern Atlantic they are present only in islands, whose limits are the Azores, Madeira or Canaries at the north, and they are not found along the continental coasts up to the latitude of Senegal. It is very clear that these species must have high thermic exigencies and they can not withstand the colder temperature of the continental waters.

Among these species, some standout because they are very common in the Canary Islands : the coastal species *Heteroconger longissimus* Günther, 1870 (see Saldanha *et al.*, 1986), *Ophioblennius atlanticus* (Valenciennes, 1836), *Labrisomus nuchipinnis* (Quoy and Gaimard, 1824), *Canthigaster rostrata* (Bloch, 1786) and *Stephanolepis hispidus* (Linnaeus, 1766), and the deep sea rocky bottom species *Polymixia nobilis* Lowe, 1838.

Two further holocentrid species known in the North and East-central Atlantic Ocean, also have an amphiatlantic distribution pattern : *Holocentrus ascensionis* (Osbeck, 1765) and *Myripristis jacobus* Cuvier, 1829. They have dispersed and principally insular populations, but in both cases they are restricted to the more tropical sectors of the Eastern Atlantic. We suspect they originally came from the Western Atlantic and dispersed by means of the intertropical currents between both eastern and western coasts. The remaining holocentrid species is not amphiatlantic and does not present a dispersed and insular distribution pattern : *Sargocentron hastatus* (Cuvier, 1829) has been recorded from Portugal and is thought to be distributed between Cap Vert and Angola (Fowler, 1936 ; Nielsen, 1973 ; Greenfield, 1981 ; Ben-Tuvia, 1986).

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REFERENCES

BEN-TUVIA A., 1986. - Holocentridae. *In* : Fishes of the North Eastern Atlantic and the Mediterranean (P.J.P. Whitehead, M.L. Bauchot, J.C. Hureau, J. Nielsen & E. Tortonese, eds.)Vol. II : 753 - 755. Unesco. Paris.

BOHLKE J.E. & C.C.G. CHAPLIN, 1968. - Fishes of the Bahamas and adjacent tropical waters. Ed. : The Academy of Natural Sciences of Philadelphia ; xxiii + 771 pp.

CUVIER M.B. & . VALENCIENNES, 1831. - Histoire Naturelle des Poissons. Vol. VIII, xix + 509 pp.. Ed. A. Asher & Co. (Reimpression 1969). Amsterdam.

DOOLEY J.K., VAN TASSEL J. & A. BRITO, 1985. - An annotated checklist of the shorefishes of the Canary Islands. *Amer. Mus. Novitates*, 2824 : 1-49.

FOWLER H.W, 1936. - The marine fishes of West Africa. Based on the collection of the American Museum. Congo Expedition 1909 - 1915. *Bull. Amer. Mus. Nat. Hist.* , 70 (1) : vii + 605 pp.

GREENFIELD D.W., 1981. - Holocentridae. *In* : FAO species identification sheets for fishery purposes. Eastern Central Atlantic ; fishing areas 34 and 47 (in part). (W. Fischer, G. Bianchi & W.B. Scott, eds.). Vol. II : pag. var. Canada Funds-in-Trust. Ottawa.

GUITART D.J., 1979. - Sinopsis de los peces marinos de Cuba. Tomo I. Ed. : Cientifico-Tecnica. Ministerio de Cultura, 308 pp. La Habana.

LOZANO I. J. & G. LOZANO, 1985. - Lista preliminar de las especies de los órdenes Beryciformes y Stephanoberyciformes de las Islas Canarias y aguas adyacentes. *Vieraea*, 14(1 - 2) : 191-202.

MATSUURA K. & T. SHIMIZU, 1982. - The squirrelfish genus *Adioryx*, a junior synonym of *Sargocentron*. *Jap. Jour. Ichthyol.*, 29(1) : 93-94.

NIELSEN J., 1973. - Holocentridae. *In* : Check-list of the fishes of the North-Eastern Atlantic and of the Mediterranean (J.C. Hureau & TH. Monod, eds.). Vol. I ; p. 342 Unesco. Paris.

RANDALL J.E., 1968. - Caribbean reef Fishes. T.F.H. Publications Inc. LTD., 318 pp. Hong-Kong.

RANDALL J.E., SHIMIZU T. & T. YAMAKAWA, 1982. - A revision of the holocentrid fish genus *Ostichthys*, with descriptions of four new species and a related genus *Jap. Jour. Ichthyol.*, 29(1) : 1-26.

SALDANHA L., MAUL G.E., BISCOITO M. & F. ANDRADE, 1986. - On the identity of *Heteroconger longissimus* Günther, 1870 and *Heteroconger halis* (Böhlke, 1957) (Pisces : Congridae). *Bocagiana* (104) : 1-17.

WOODS L.P. & D.W. GREENFIELD, 1977. - Holocentridae. *In* : FAO species identification sheets for fishery purposes. Western Central Atlantic ; fishing area 31 (W. Fisher, ed.). pag. var. FAO. Roma.

WOODS L.P. & P.M. SONODA, 1973. - Order Berycomorphi (Beryciformes). *In* : Fishes of the Western North Atlantic. *Sears found. Mar. Res.*, 1(6) : 263 - 396.

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